

TITLE

An extendible user input device.

5 TECHNICAL FIELD

Embodiments of the present invention relate to an extendible user input device. In particular, they relate to an extendible user input device for a portable gaming device.

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BACKGROUND OF THE INVENTION

It is common practice for a joystick to be used as a user input device for arcade games, home gaming systems and personal computers. Such joysticks provide good user input control and sensitivity however they are large in comparison to portable electronic devices such as, for example, mobile cellular telephones or personal digital assistants.

At present in a portable electronic device, such as a cellular mobile telephone, the mobile telephone keypad is used as the user input device when playing a game. This provides less control and sensitivity than a joystick. It would therefore be desirable to integrate a joystick into a portable electronic device to obtain greater control and sensitivity during game play.

However, the presence of an additional input device would increase the size and complexity of the device and the shape of an integrated joystick would make the shape of the electronic device irregular and awkward. It may, for example, no longer easily fit in a pocket.

30 BRIEF SUMMARY OF THE INVENTION

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According to one embodiment of the present invention, there is provided a portable electronic gaming device comprising: a user input device comprising an extendible support having at a first end a tactile member for user actuation and mounted at a second end for pivotal movement, wherein the user input device has a first configuration in which the extendible support is retracted and a second configuration in which the extendible support is extended, wherein in the second configuration the user input device is operable as a joystick game controller.

10 According to another embodiment of the present invention, there is provided a user input device, for a portable electronic gaming device, comprising: an extendible support having at a first end a tactile member for user actuation and mounted for pivotal movement about a second end, wherein the user input device has a first configuration in which the extendible support is retracted and a second configuration in which the extendible support is extended, wherein in the second configuration the user input device is operable as a joystick.

20 According to another embodiment of the present invention, there is provided an electronic device comprising: a user input device comprising an extendible support having at a first end a tactile member for user actuation and mounted at a second end for pivotal movement, wherein the user input device has a first operational configuration in which the extendible support is retracted and a second operational configuration in which the extendible support is extended, wherein the user input device functions as an input device in both first and second operational configurations.

30 According to another embodiment of the present invention, there is provided a user input device, for an electronic device, comprising: an extendible support having at a first end a tactile member for user actuation and mounted for pivotal movement about a second end, wherein the user input device has a first operational configuration in which the extendible support is retracted and

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a second operational configuration in which the extendible support is extended, wherein the user input device functions as an input device in both first and second operational configurations.

- 5 Embodiments of the invention may consequently provide a user input device with good sensitivity when it is in the second extended configuration but with a small size and low profile when in the first retracted configuration.

- 10 Further embodiments of the invention may provide a user input device that can be moved between the first retraced configuration and the second extended configuration by a simple, single user action.

- 15 The term 'gaming device' includes an electronic device that may be used to play games, a multi-functional electronic device that may be used to play games as one of its functions and also an electronic device that is dedicated to playing games. Although the inventive user input device is particularly applicable to gaming devices, its potential application is broader and may be used with any electronic device that requires a user input device.

20 BRIEF DESCRIPTION OF DRAWINGS

- For a better understanding of the present invention reference will now be made by way of example only to the accompanying drawings in which:
- Fig. 1 schematically illustrates a hand-held electronic gaming device 2;
- 25 Fig. 2 illustrates the exterior of the hand-held electronic gaming device 2;
- Figs 3A and 3B illustrate a user input device in a first retracted configuration and in a second extended configuration; and
- Figs 4A, 4B and 4C illustrate one type of mechanism that allows a user to extend the user input device.

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DETAILED DESCRIPTION OF EMBODIMENT(S) OF THE INVENTION

The Figures illustrate a user input device 10, for a portable electronic gaming device 2, comprising: an extendible support 12 attached at a first end 13 to a tactile member 20 for user actuation and mounted for pivotal movement about a second end 14, wherein the user input device 10 has a first configuration (Fig. 3A, Fig4A) in which the extendible support 12 is retracted and a second configuration (Fig. 3B, Fig 4C) in which the extendible support 12 is extended, wherein in the second configuration the user input device 10 is operable as a joystick.

Fig. 1 schematically illustrates a hand-held, pocket-sized, electronic gaming device 2. In this example, the electronic gaming device 2 is also a mobile cellular telephone. However, in other implementations the device 2 may be a dedicated gaming device.

The electronic gaming device 2 comprises; a processor 4 connected to a display 3, a memory 5, a cellular radio transceiver 6 and a user input device 10. The processor 4 controls the operation of the device 2. It receives input command signals from the user input device 10. Although, a particular arrangement of functional components is illustrated any suitable arrangement may be used. For example, in some implementations the device 2 may have multiple processors and/or memories, additional components for audio input and output and an additional user input device such as a keypad.

Fig. 2 illustrates the exterior of the hand-held, pocket-sized, electronic gaming device 2. The device 2 has a body shell 7 with an exterior upper surface 8. The user input device 10 extends through an aperture 9 in the exterior upper surface 8.. The aperture 9 is a hole through the body shell 7.

Figs. 3a and 3b illustrate one example of a user input device 10. The user input device 10 comprises: a tactile member 20 which a user touches to move and thus actuate the user input device 10; an extendible support 12

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connected at a first end 13 to the tactile member 20 and pivotally connected at a second end 14 via an interface 40 to transducer circuitry 42.

5 The tactile member 20 comprises an upper portion 21 that is adapted to provide grip for a user's thumb or finger and a downwardly extending skirt 22 that extends about the upper portion 21. In this example, the upper portion is shaped as a circle and the skirt 22 extends around the upper portion in the shape of a circle. The skirt 22 therefore forms a downwardly extending tube-like portion. The lowermost face 23 of the skirt 23 may abut the exterior upper
10 surface 8 of the body shell 7, when the user input device is used in a first retracted configuration (shown in Fig. 3A), limiting the extent of pivotal movement in the first configuration.

The extendible support 12 is user extendible from a first length illustrated in
15 Fig. 3A to a second length illustrated in Fig. 3B. The second length is typically 4 to 8 mm longer than the first length. In this example, the extendible support comprises a first upper portion 30 that moves within a second lower portion 32. The upper portion 30 moves at least rectilinearly upwards and downwards along an axis within the second lower portion 32 and may additionally rotate
20 about that axis.

A lower end of the upper portion 30 moves within the lower portion 32 and an upper end of the upper portion 30 provides the first end 13 of the extendible support 13.
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An upper end of the lower portion 32 receives the upper portion 30 and a lower end of the lower portion 32 is connected to an interface 40.

30 The lower end of the lower portion 32 has a chamfered portion 34 that extends around the extendible support 12. The chamfered portion 34 allows large scale pivotal movement of the extendible support 12 without abutment between the extendible support 12 and the transducer circuitry 42.

The extendible support 12 is connected from the lower portion of the second portion 30 to transducer circuitry 42 via the interface 40. The interface 40 communicates movement of the extendible support 12 to the transducer circuitry 42, which in turn converts this movement into electrical signals that are provided to processor 4 as input commands. Typically the transducer circuitry will be mounted on the printed wiring board (PWB) of the device 2. The input device 2, in this example, is of a modular design and can be releasably connected to a PWB.

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The user input device 10 has a first retracted configuration, illustrated in Fig 3A, in which the extendible support is retracted and pivotal movement of the user input device is restricted compared to a second configuration, illustrated in Fig 3B. In this example, the pivotal movement of the input device 10 is physically restricted by the abutment of skirt 22 with the exterior upper surface 8.

In the first restricted configuration, the user input device 10 may be used, for example as a 2-way, 4-way, 5-way, 8-way or 9-way user input device. That is, although pivotal movement is restricted, it is sufficient to allow a single input at each 'point of a compass'. For a four point compass this would give up to four separate inputs by pushing separately in the directions North, South, East, West. For an eight point compass this would give eight separate inputs by pushing separately North, South, East, West, North-East, North-West, South-East, South-West. The transducer circuitry 42 may additionally be able to discriminate when the user input device 10 is pushed directly downwards towards the transducer circuitry 42 along its axis of extension. This gives a respective fifth or ninth input. In the first retracted configuration the user input device may be used a navigation device, like a Navikey [™] used in Nokia products or as function keys. It may be used to navigate, for example, through menus. It may even be used in game play but does not give the degree of control and sensitivity provided by the second extended configuration.

The user input device 10 has a second extended configuration, illustrated in Fig. 3B, in which the extendible support 12 is extended and the user input device is operable as a joystick game controller. The user input device 10
5 pivots freely in the second configuration and the tactile member 10 is raised approximately 3-8mm in the second configuration compared to the first configuration.

Typically, the user input device 10 provides some sort of mechanism that
10 allows a user to easily extend the extendible support 12. One example of such a mechanism is shown in Figs 4A, 4B and 4C.

The mechanism illustrated automatically extends the user input device 10 in response to a user performing a twisting action about an axis of extension of
15 the extendible support 12.

The first portion 30 of the extendible support 12 is shaped like an inverted T bar. The lower portion of the upper portion 30 has a laterally extending bar 31 attached to an upwardly extending shaft.
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The second portion 32 of the extendible support 12 comprises a channel 34 in which the bar 31 is permanently located. The channel comprises two parallel circular disc-like cavities 35, 36 joined by an interconnecting cubical channel 37. Each of the circular disc-like cavities 35, 36 is sized to allow the laterally
25 extending bar 31 to freely move when the extendible support 12 is rotated about its axis of extension. The interconnecting channel 37 is sized to allow the shaft of the upper portion 30 to move freely when the extendible support 12 is rotated about its axis of extension and when the extendible support 12 is extended. The interconnecting channel is sized to allow the bar 31 of the
30 upper portion 30 to move freely within it while the extendible support 12 is being extended.

A spring 38 is placed between the bar 31 of the upper portion 30 and the base of the channel 34 in the second lower portion 32. The spring 38 biases the extendible support 12 towards its extended position.

- 5 In Fig 4A, the user input device is 'locked' in the first configuration. The bar 31 is located within the cavity 36 and abuts an upper surface 39 of the cavity 36.

The user places a thumb or finger on the upper portion 21 of the tactile member 20 and twists 90 degrees. This twisting movement aligns the bar 31
10 with the interconnecting channel portion 37. The bar is no longer held in place by the surface 39 and it moves under the bias of the spring 38 upwards along the interconnecting channel portion 37 as shown in Fig 4B.

When the bar 31 reaches the end of the interconnecting channel portion 37,
15 the user places a thumb or finger on the upper portion 21 of the tactile member 20 and twists 90 degrees. This twisting movement moves the bar 31 out of alignment with the interconnecting channel portion 37 and 'locks' the user input device in the second configuration.

- 20 The process can be reversed to change the user input device from the second extended configuration to the first retracted configuration.

The term 'lock' used in the preceding paragraphs is intended to mean that the user input device remains in a user selected configuration until the user
25 performs a specific act to change configurations. This specific act will generally not occur during the normal use of the user input device 10 for user input.

Another mechanism that allows a user to easily extend the extendible support
30 12 provides a guiding cavity in the interior of the lower portion 32. The guiding cavity forms an upwardly extending spiral centred on the axis of extension of the extendible member 12. The guiding cavity provides an interior camming

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surface along which the upper portion 30 of the extendible member 12 is moved upwardly as it is twisted by a user. The cavity provides a guide mechanism for guiding the extendible member between its retracted configuration and its extended configuration.

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The user input device 10 may additionally have discriminating means for discriminating whether the user input device 10 is in a first retracted configuration or a second extended configuration and for informing the processor 4 of the current configuration. The operation of the electronic gaming device 2 may be dependent upon the configuration of the user input device. For example, extending the extendible support may automatically initiate a gaming application in the device 2. A suitable discriminating means would be a switch that is thrown as the extendible support 12 moves from the first configuration to the second configuration and thrown when the extendible support moves from the second configuration to the first configuration.

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Although embodiments of the present invention have been described in the preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the invention as claimed.

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Whilst endeavoring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

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I/we claim

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